Notice No.2

Rules and Regulations for the Classification of Ships, July 2022

The status of this Rule set is amended as shown and is now to be read in conjunction with this and prior Notices. Any corrigenda included in the Notice are effective immediately.

Please note that corrigenda amends to paragraphs, Tables and Figures are not shown in their entirety.

Issue date: December 2022

Amendments to	Effective date	IACS/IMO implementation (if applicable)
Part 1, Chapter 2, Section 2	1 January 2023	N/A
Part 1, Chapter 3, Sections 1, 2, 3, 5, 7, 8, 11, 18 & 23	1 January 2023	N/A
Part 1, Chapter 3, Sections 2 & 14	1 January 2023	N/A

Part 1, Chapter 2
Classification Regulations

■ *Section 2*
Character of classification and class notations

2.3 Class notations (hull)

(Part only shown)

2.3.14 **Class notations for CSR bulk carriers**. In general, CSR bulk carriers less than 150 m in length are to comply with the requirements of *Pt 4, Ch 7, 1.4 Class notation for CSR bulk carriers* and the *IACS Common Structural Rules (CSR)* and will be eligible for one of the following mandatory class notations:

In general, CSR bulk carriers equal to or greater than 150 m in length are to comply with the requirements of *Pt 4, Ch 7, 1.5 Class notation for non-CSR bulk carriers* and the ~~IACS Common Structural Rules (CSR)~~ *IACS Common Structural Rules (CSR)* and will be eligible for one of the following mandatory class notations:

~~(maximum cargo density (in tonnes/m^3))~~ {Maximum cargo density in t/m^3}	For notations **BC-A** and **BC-B** if the maximum cargo density is less than 3,0 tonnes/m^3.
~~(no MP)~~ {No MP}	For all notations when the vessel has not been designed for loading and unloading in multiple ports in accordance with the conditions specified in *IACS Common Structural Rules (CSR)*, Pt 1, Ch 4, Sec 8,4.2.2~~;~~.
GRAB [X]	Where the net thickness of plating of inner bottom, hopper tank sloping plate, transverse lower stool, transverse bulkhead plating and inner hull up to a height of 3,0 m above the lowest point of the inner bottom, excluding bilge wells comply with ~~IACS Common Structural Rules (CSR)~~ *IACS Common Structural Rules (CSR)*, Pt 2, Ch 1, 6 for ~~BC-A and BC-B~~ **BC-A** and **BC-B**, *see IACS Common Structural Rules (CSR)*, Pt 1, Ch 1, Sec 1,3.2.1~~;~~.
{Block loading}	For additional service feature BC-A, when the ship is intended to operate in alternate block load condition, *see IACS Common Structural Rules (CSR)*, Pt 1, Ch 4, Sec 8, 4.2.3, item d.

(Part only shown)

2.3.17 **ShipRight( ).** Where one or more of LR's ShipRight procedures for the following have been satisfactorily applied, then a notation showing the associated characters of the procedure(s) within brackets will, at the Owner's request, be entered in column 4 of the *Register Book*, preceded by the word **ShipRight**, e.g. **ShipRight(CM, SDA, FDA plus(25,NA))**. The requirements pertaining to these notations and the ShipRight procedures are given in *Pt 3, Ch 16 ShipRight Procedures for the Design, Construction and Lifetime Care of Ships*.

SDA	This ShipRight notation (Structural Design Assessment) will be assigned when direct calculations in accordance with the relevant ShipRight procedures have been applied. The ShipRight notation **SDA** is mandatory upon application of any of the following ShipRight notations: **FDA, FDA plus(), FDA ICE, FDA SPR** , **WDA1** and **WDA2**.
VIBM()	This ShipRight notation (Vibration Measurement) will be assigned when measurement of vibration has been carried out and verified in accordance with the relevant ShipRight procedures. The **VIBM()** notation with the extension of one or more of the following associated supplementary characters shown in brackets may be assigned: **H** for hull vibration measurement; **M** for machinery vibration measurement.
SLDA()	This ShipRight notation (Slamming Load Design Assessment) will be assigned when direct calculations of wave slamming loads and the associated hull structural strength have been carried out using a calculation procedure agreed by LR. The **SLDA()** notation with the extension of one or two of the following associated supplementary characters shown in brackets, detailing the specified assessment area or areas, may be assigned: B for slamming load and hull strength assessment of ship's bow flare region; **S** for slamming load and hull strength assessment of ship's stern counter region.

2.8 Descriptive notes

2.8.2 **ShipRight()**. Where one or more of LR's ShipRight procedures for the following have been satisfactorily applied, then a descriptive note showing the associated characters of the procedure(s) within brackets will, at the Owner's request, be entered in column 6 of the *Register Book*, preceded by the word **ShipRight**, e.g. **ShipRight(IHM, SERS)**. The requirements pertaining to these descriptive notes and the ShipRight procedures are given in *Pt 3, Ch 16 ShipRight Procedures for the Design, Construction and Lifetime Care of Ships* and *Pt 5, Ch 21 Requirements for Condition Monitoring and Condition-Based Maintenance Systems*, or directly within the relevant *ShipRight Procedure* document.

AM() This ShipRight descriptive note (Alarm Management) will be assigned where the ship's alarm management system complies with the relevant ShipRight procedure.

For ships for the carriage of liquefied gases in bulk the characters of the procedure are **AM(C, LG)** where:

- **C** indicates Cargo Alarms.
- **LG** indicates Liquified Gas.

ShaftRight() This ShipRight descriptive note will be assigned when the main propulsion shafting alignment has been carried out in accordance with ShipRight Procedure *ShaftRight: Main Propulsion Shafting Alignment Procedure*, which LR considers to be best practice during design, construction and trials. The **ShaftRight()** descriptive note with the extension of one or more of the following associated supplementary characters shown in brackets, may be assigned:

- **E** Existing design. Applicable to vessels having main propulsion shafting and hull arrangements which have been previously implemented and, for which, proven satisfactory service experience is demonstrated;
- **N** New design. Applicable to a new main propulsion shafting arrangement within a new, or previously implemented, hull design.

2.8.10 OHCF() This descriptive note will be assigned to general cargo ships where the class notation Hatch Covers may be omitted in Hold (No(s) …) where the longitudinal strength has been assessed using flooded strength limits, ***see*** *Pt 3, Ch 9, 10.3 Longitudinal strength 10.3.3*. The wave height limitation for loading conditions where hatch covers are omitted is to be appended to the descriptive note within brackets.

2.8.11 **Single pass loading** This descriptive note may be assigned to ore carriers, where the maximum permissible cargo intake per cargo hold may be loaded in a single loading pour, *see Pt 4, Ch 11, 13 Single pass loading*.

2.8.12 **READY().** When satisfactory preparation has been made at the time of completion and delivery or refit of the vessel for a structure, a system or equipment which is subject to classification, then this descriptive note, showing the associated classification characters within brackets will, at the Owner's request, be entered in the *Register Book* preceded by the word **READY**, e.g. **READY(RIGGING)**.

If the asset is **READY()** for multiple notations the descriptive note will appear as **READY(notation 1, notation 2)**.

Satisfactory preparation includes but is not limited to:

- Clear and comprehensive definition of the intended structure, system or equipment in line with classification requirements.
- The interface boundary delimiting the physical and operational boundary is clearly defined and sets out the components that are omitted during construction.
- A list of interface requirements even though these are not typically part of the requirements for classification. These are to be accompanied by technical solutions or reference to design features that show how each of the interface requirements is met. The interface location and requirements are to be jointly developed by the Client and LR.
- Interface requirements may be quantitative or qualitative. Suitable safety criteria are to be defined.
- The design of the asset fully incorporates the intended structure, system or equipment. This is to be verified during appraisal.
- As far as practicable, the fitting of the omitted structure, system or equipment is not to depend on the removal of other structures, systems or equipment but should only depend on the addition of the omitted structure, system or equipment.

Each of the design documents which are required for classification is assessed as if the structure, system or component is fitted. If details of the system are unknown at the time of application for the descriptive note, design constraints may, on occasion, be confirmed by an Approvall in Principle (AiP). This course of action will be captured in the descriptive note in the following manner: **READY(NOTATION(A))** where A indicates the AiP.

Additional interface documents are assessed with particular attention to the practicality and feasibility of the boundary definition.

Construction is carried out as per appraised plans omitting the structure, system or equipment set out by the interface boundary.

The **READY()** descriptive note is awarded based on the documented verification of the above requirements. Appraisal and survey by LR will be carried out as far as practicable for the interface arrangements and, if applicable, the partially installed system.

Notations are included in the list of those eligible for the **READY()** descriptive note at the discretion of LR.

Part 1
Chapter 3
Periodical Survey Regulations

■ *Section 1*
General

1.5 Definitions

1.5.13 A **Ballast Tank** is a tank which is used ~~solely~~primarily for the carriage of salt-water ballast. For bulk carriers, a space which is used for both cargo and salt-water ballast will be treated as a salt-water ballast tank when substantial corrosion has been found in that space. For double skin bulk carriers, the double side tank is to be considered as a separate tank even if it is connected to either the topside or hopper side tank. For oil tankers and chemical tankers, a combined tank which is used for both cargo and salt-water ballast as a routine part of the ship's operation will be treated as a ballast tank. A cargo tank which in exceptional cases may carry salt-water water ballast during severe weather conditions and is not designated as a combined cargo/ballast tank will be treated as a cargo tank.

1.6 Preparation for survey and means of access

~~1.6.17 For a fuel installation using **gases or other low-flashpoint fuels** *see also Pt 1, Ch 3, 24.1 General* .~~

■ *Section 2*
Annual Surveys - Hull and machinery requirements

2.1 Definitions

(Part only shown)

Table 2.2.2 Special features notations

Special features notation	Description	*See also*
Hatch Covers may be omitted in Hold (No(s) …)	Assigned where the omission of hatch covers has been specially considered based upon the model tests or alternative means to determine the quantity of water likely to ingress the cargo holds and the means by which it is effectively and safely discharged	*Pt 3, Ch 9, 10 Omission of hatch covers* *Pt 5, Ch 13, 3.8 Maintenance of integrity of bulkheads*

2.2 Annual Surveys

Existing paragraph 2.2.21 has been deleted and replaced with the below:

2.2.21 Where Lithium-Ion battery system installations with total system capacity exceeding 20 kWh are used as a power source for essential or emergency systems, testing of the following is to be conducted annually so far as is practicable:

- manual and automatic safety functions; and
- monitoring and control functions.

2.2.22 The safety aspects of spaces or compartments containing Lithium-Ion batteries used as a power source for essential or emergency systems are to be examined as applicable to the installation. This could include examinations of:

(a) structural fire protection;
(b) fixed fire detection;
(c) fixed firefighting system(s);
(d) ventilation and associated dampers;
(e) off-gas detection, exhaust and/or extraction arrangement;
(f) integrity of battery crates, trays, boxes, shelves and other structural parts;
(g) battery cooling arrangement;
(h) electrical power cabling, switchgear and converters; and
(i) EEBD (emergency escape breathing device) and means of escape.

Existing paragraphs 2.2.22 to 2.2.51 have been renumbered 2.2.23 to 2.2.52.

2.2.49 For a fuel installation using **gases or other low-flashpoint fuels** *see also* ~~*Pt 1, Ch 3, 24.3 Annual Surveys - General Requirements for Fuel Systems*~~ ~~to~~ ~~*Pt 1, Ch 3, 24.6 Annual Survey - Fuel Bunkering System*~~ *Pt 1, Ch 3, 23.2 Annual Surveys*.

2.2.52 For ships assigned the class notation **Hatch Covers may be omitted in Hold (No(s) ...)** the associated drainage arrangements are to be examined and tested, including any additional bilge pumping arrangements.

■ *Section 3*
Intermediate Surveys - Hull and machinery requirements

3.3 Intermediate Surveys

3.3.23 For a fuel installation using **gases or other low-flashpoint fuels** *see also* ~~*Pt 1, Ch 3, 24.7 Intermediate Surveys*~~ *Pt 1, Ch 3, 23.3 Intermediate Surveys*.

■ *Section 5*
Special Survey - General - Hull requirements

5.1 General

5.1.3 Additional requirements for **general dry cargo ships** are given in this Section; **dry bulk cargo ships bulk carriers** in *Pt 1, Ch 3, 6 Special Survey - Bulk carriers - Hull requirements*; **oil tankers** (including ore/oil ships and ore/bulk/oil ships) in *Pt 1, Ch 3, 7 Special Survey - Oil tankers (including ore/oil ships and ore/bulk/oil ships) - Hull requirements*; **chemical tankers** in *Pt 1, Ch 3, 8 Special Survey - Chemical Tankers - Hull requirements*; **ships for liquefied gases** in *Pt 1, Ch 3, 9 Ships for liquefied gases*, as applicable; **gases or other low-flashpoint fuels** in *Pt 1, Ch 3, 23 Fuel installations using gases or other low-flashpoint fuels*, as applicable.

■ *Section 7*
Special Survey - Oil tankers (including ore/oil ships and ore/bulk/oil ships) - Hull requirements

7.7 Thickness measurement

(Part only shown)

Table 3.7.6 Minimum requirements for thickness measurement - Single hull and double hull oil tankers, ore/oil ships and ore/bulk/oil ships

Special Survey I **(Ships 5 years old)**
(1) 1 section of deck plating for the full beam of the ship within 0.~~,~~5L amidships in way of a ballast tank, if any, or a cargo tank used primarily for water ballast. *See* Note 8. (2) Measurements for general assessment and recording of corrosion pattern of the structural members subject to Close-up Survey in accordance with *Table 3.7.2 Minimum requirements for Close-up Survey - Single hull oil tankers, Table 3.7.3 Minimum requirements for Close-up Survey - Double hull oil tankers ,Table 3.7.4 Minimum requirements for Close-up Survey - Ore/oil ships* or *Table 3.7.5 Minimum requirements for Close-up Survey - Ore/bulk/oil ships. See* Notes 4 and 8. (3) Suspect areas, as required by the Surveyor. *See* Note 7.
Note *8*. Not applicable for double hull oil tankers.

■ *Section 8*
Special Survey - Chemical Tankers - Hull requirements

8.7 Thickness measurement

(Part only shown)

Table 3.8.4 Minimum requirements for thickness measurement - Single and double hull chemical tankers

Special Survey I (Ships 5 years old)
~~(1) 1 section of deck plating for the full beam of the ship within 0,5L amidships (in way of a ballast tank, if any).~~ ~~(2) Measurements for general assessment and recording of corrosion pattern of the structural members subject to Close-up Survey in accordance with *Table 3.8.2 Minimum requirements for Close-up Survey - Single hull chemical tankers* and *Table 3.8.3 Minimum requirements for Close-up Survey - Double hull chemical tankers.* See Note 4.~~ ~~(3)~~(1) Suspect areas, as required by the Surveyor. *See* Note 6.

■ *Section 11*
Machinery surveys - General requirements

11.2 Complete Surveys

(Part only shown)

11.2.4 The following auxiliaries and components are also to be examined:

(f) Where Thrusters and/or Podded Propulsors are fitted and have been assigned the ShipRight descriptive note **ThCM**, the degree of inspection required whilst in dock will be determined by the analysis of Condition Monitoring records. Refer to *ShipRight Procedure Machinery Planned Maintenance and Condition Monitoring*~~, Section 8~~.

(g) Fuel cells and associated equipment.

11.2.12 For a fuel installation using **gases or other low-flashpoint fuels** *see also* ~~*Pt 1, Ch 3, 24.8 Complete Surveys - General requirements* and *Pt 1, Ch 3, 24.9 Complete Surveys - Consumers and other equipment*~~ *Pt 1, Ch 3, 23.4 Complete Surveys*.

■ *Section 14*
Electrical equipment

14.2 Complete Surveys

4.2.16 Where batteries with charging power higher than 2kW provide the source of power for any essential or emergency services, their installation, including charging and ventilation arrangements, is to be examined.

14.2.17 Sufficient battery capacity shall be verified for Lithium-Ion battery system installations used as the primary power source for emergency systems.

14.2.18 Where Lithium-Ion batteries with total system capacity exceeding 20 kWh are used as the primary power source for essential or emergency systems, a test of all required monitoring and safety functions shall be carried out.

14.2.19 A test of the safety functions in spaces or compartments containing Lithium-Ion batteries with total system capacity exceeding 20 kWh used as power source for essential and emergency services shall be carried out, i.e., fire detection and extinguishing, gas detection, ventilation etc. as applicable to the installation.

14.2.20 The safety aspects of spaces or compartments containing Lithium-Ion batteries used as a power source for essential or emergency systems are to be examined as applicable to the installation. This could include examinations of:

(a) structural fire protection;
(b) fixed fire detection;
(c) fixed firefighting system(s);
(d) ventilation and associated dampers;
(e) off-gas detection, exhaust and/or extraction arrangement;

(f) integrity of battery crates, trays, boxes, shelves and other structural parts;
(g) battery cooling arrangement;
(h) electrical power cabling, switchgear and converters; and
(i) EEBD (emergency escape breathing device) and means of escape.

■ *Section 18*
Inert gas systems

18.2 Scope of surveys

18.2.5 ~~See *Pt 1, Ch 3, 24.3 Annual Surveys - General Requirements for Fuel Systems 24.3.7* and *Pt 1, Ch 3, 24.7 Intermediate Surveys 24.7.1* for~~ For inert gas systems on ships with a fuel installation using **gases or other low-flashpoint fuels** *see Pt 1, Ch 3, 23.2 Annual Surveys*, *Pt 1, Ch 3, 23.3 Intermediate Surveys* and *Pt 1, Ch 3, 23.4 Complete Surveys*.

■ *Section 23*
Fuel installations using gases or other low-flashpoint fuels

Existing Section 23 has been deleted and replaced with below:

23.1 General

23.1.1 This Section provides requirements for the survey of a fuel installation using gases or other low-flashpoint fuels as defined in *Pt 1, Ch 3, 1.5 Definitions 1.5.35* (gases or other low-flashpoint fuels are hereinafter referred to as fuel).

23.1.2 The survey requirements below may be supplemented or replaced by alternative/equivalent survey requirements for ships using:

- *ShipRight Procedure for Risk Based Certification (RBC)*;
- Novel/complex systems, machinery and equipment as defined in *Pt 1, Ch 2, 3.6 Surveys for novel/complex systems, machinery and equipment*;
- Fuels, appliances and arrangements not specifically addressed in the *Rules and Regulations for the Classification of Ships using Gases or other Low-flashpoint Fuels.*

Refer to the 'Alternative/Equivalent Design File' (AED File) which is to be retained on board for details of the alternative/equivalent design and how it is operated and maintained, and of the supplementary or alternative/equivalent survey requirements.

Prior approval is required for alterations to the alternative/equivalent design and how it is operated and maintained, to the survey requirements or to the AED File.

23.1.3 The requirements of *Pt 1, Ch 3, 11 Machinery surveys – General requirements* and *Pt 1, Ch 3, 14 Electrical equipment* are to be complied with, as applicable.

23.2 Annual Surveys

23.2.1 The AED File is to be confirmed as being on board the vessel, as applicable.

Refer to the AED File for supplementary or alternative/equivalent survey requirements.

23.2.2 The logbooks and maintenance, inspection, testing and operating records are to be examined with regard to correct functioning of gas detection systems, fuel storage, bunkering and supply systems, fuel consumers, etc. The operating hours per day of the reliquefaction plant, gas combustion unit, the boil-off rate, and nitrogen consumption (for membrane containment systems, etc.) are to be considered together with gas detection records, as applicable.

23.2.3 The manufacturer/builder instructions and manuals covering the operations, safety and maintenance requirements and occupational health hazards relevant to fuel storage, bunkering and supply systems, and other associated systems for use of the fuel, are to be confirmed as being on board the vessel.

23.2.4 Control, monitoring and safety systems are to be surveyed, including:

- Confirmation that gas detection and other leakage detection equipment located in tank connection spaces and in compartments containing fuel storage, bunkering and supply equipment or components or associated systems, including indicators and alarms, is in satisfactory operating condition. Maintenance and recalibration of the gas detection systems is to be verified in accordance with the manufacturers' recommendations.

- Verification of the satisfactory operation of the control, monitoring and automatic shutdown systems, as far as practicable, of the fuel supply and bunkering systems.
- Operational testing, as far as practicable, of the shutdown of ESD protected machinery spaces.

23.2.5 Piping, hoses, emergency shutdown valves, remote operating valves, relief valves, and machinery and equipment for fuel storage, bunkering and supply, such as venting, compressing, refrigerating, liquefying, heating, cooling or otherwise handling the fuel, are to be examined, as far as practicable. Means for inerting are to be examined and tested, as far as practicable, including associated alarm testing and backflow prevention arrangements. Stopping of pumps and compressors upon emergency shutdown of the system is to be confirmed, as far as practicable.

23.2.6 Control, monitoring and safety systems, including gas leakage and fire detection equipment for internal combustion engines, fuel cells and other fuel consumers, are to be tested, as far as practicable.

23.2.7 Examination of the ventilation system, including portable ventilating equipment where fitted, is to be made for tank connection spaces and spaces containing fuel storage, bunkering and supply units or components or associated systems, including air locks, pump rooms, compressor rooms, fuel preparation rooms, fuel valve rooms, control rooms and spaces containing gas consumers and associated equipment. Ventilated double-walled piping, ducting containing fuel piping, and associated fans are to be examined. Where alarms, such as differential pressure and loss of pressure alarms, are fitted, these are to be operationally tested as far as practicable.

23.2.8 Portable and fixed drip trays and insulation for the protection of the ship's structure in the event of leakage are to be examined.

23.2.9 Hazardous area boundaries are to be examined, as far as practicable. Electrical equipment and bulkhead/deck penetrations, including access openings in hazardous areas, are to be examined for continued suitability for their intended service and installation area.

23.2.10 Electrical bonding arrangements in hazardous areas, including bonding straps where fitted, are to be examined.

23.2.11 Fuel storage, bunkering and supply systems are to be examined, as far as applicable. Insulation need not be removed, but any deterioration or evidence of dampness is to be investigated.

23.2.12 Fuel storage arrangements are to be surveyed, including:
- External examination of the storage tanks including the secondary barrier, if fitted and accessible;
- General examination of the fuel storage hold place;
- Internal and external examination of tank connection spaces;
- External examination of tank, including connecting piping arrangements and relief valves;
- Verification of satisfactory operation of tank monitoring system, including vacuum monitoring where fitted;
- Examination and testing of installed bilge alarms and means of drainage of the compartment;
- Testing of the remote and local closing of the installed main tank valve;
- Verification of satisfactory operation of the heating arrangements for structures in cofferdams and other spaces, where fitted.

23.2.13 Fuel bunkering system arrangements are to be surveyed, including:
- Examination of bunkering stations and the fuel bunkering system;
- Verification of satisfactory operation of the fuel bunkering control, monitoring and shutdown systems.

23.2.14 Fuel supply system arrangements are to be surveyed, including:
- Examination of the fuel supply system during working condition, as far as practicable;
- Verification of satisfactory operation of the fuel supply system control, monitoring and shutdown systems;
- Testing of the remote and local closing of the master fuel valve for each fuel consumer compartment.

23.3 Intermediate Surveys

23.3.1 The requirements of *Pt 1, Ch 3, 23.2 Annual Surveys* are to be complied with, as applicable.

23.3.2 A random selection of gas detectors, temperature sensors, pressure sensors, level indicators, and other equipment providing input to the fuel safety system are to be tested to confirm satisfactory operating condition. The design response of the fuel safety system upon fault conditions is to be verified.

23.4 Complete Surveys

23.4.1 The requirements of *Pt 1, Ch 3, 23.2 Annual Surveys* are to be complied with, as applicable.

23.4.2 All piping for fuel storage, bunkering and supply, such as venting, compressing, refrigerating, liquefying, heating, storing, burning or otherwise handling the fuel, and nitrogen/inerting installations are to be examined. Removal of insulation from the piping and opening for examination may be required. Where deemed necessary, a hydrostatic test to 1,25 times the Maximum Allowable Relief Valve Setting (MARVS) for the pipeline is to be carried out. After reassembly, the complete piping is to be tested for leaks. Where water cannot be tolerated and the piping cannot be dried prior to putting the system into service, the Surveyor may accept alternative testing fluids or alternative means of testing.

23.4.3 All emergency shutdown valves, check valves, block and bleed valves, master gas valves, remote operating valves, isolating valves for pressure relief valves in the fuel storage, bunkering and supply piping systems are to be examined and proven operable. A random selection of valves is to be opened for examination.

23.4.4 Pressure relief valve arrangements are to be surveyed, including:

- Fuel storage tank pressure relief valves and pressure/vacuum relief valves for the fuel storage tanks are to be opened for examination, adjusted and function tested. If the tanks are equipped with relief valves with non-metallic membranes in the main or pilot valves, such non-metallic membranes are to be replaced.
- Fuel supply and bunkering piping pressure relief valves are to be opened for examination, adjusted and function tested. Where a proper record of continuous overhaul and re-testing of individually identifiable relief valves is maintained, consideration will be given to acceptance on the basis of opening, internal examination and testing of a representative sample of valves, including each size and type of liquefied gas or vapour relief valve in use, provided there is logbook evidence that the remaining valves have been overhauled and tested since crediting of the previous Complete Survey.
- Pressure/vacuum relief valves, rupture discs and other pressure relief devices for interbarrier spaces, vacuum spaces, pipework double wall spaces and hold spaces are to be opened, examined, tested and readjusted as necessary, depending on their design.

23.4.5 Fuel handling equipment, including fuel pumps, compressors, process pressure vessels, inert gas generators, heat exchangers and other components used in connection with fuel handling, is to be examined and tested.

23.4.6 Control, monitoring and safety systems, including gas leakage and fire detection equipment for internal combustion engines, fuel cells and other fuel consumers, are to be tested.

23.4.7 Hazardous area boundaries, including penetrations, access openings and shaft seals, are to be examined.

23.4.8 Electrical bonding arrangements in hazardous areas, including bonding straps where fitted, are to be tested.

23.4.9 Electrical equipment is to be surveyed, including:

- Examination of the physical condition of electrical cables and supports, and of intrinsically safe, explosion proof or increased safety features of electrical equipment;
- Functional testing of pressurised equipment and associated alarms;
- Testing of systems for de-energising electrical equipment which is not certified for use in hazardous areas;
- An electrical insulation resistance test of the circuits terminating in, or passing through, the hazardous zones and spaces is to be carried out.

23.4.10 Safety systems arrangements are to be surveyed, including:

- Gas detectors, temperature sensors, pressure sensors, level indicators, and other equipment providing input to the fuel safety system are to be tested to confirm satisfactory operating condition;
- The design response of the fuel safety system upon fault conditions is to be verified;
- Pressure, temperature and level indicating equipment are to be calibrated in accordance with the manufacturer's requirements.

23.4.11 Liquefied gas fuel storage tanks are to be examined in accordance with the approved inspection/survey plan, including:

- Tank connection spaces, interbarrier spaces and hold spaces are to be verified gastight.
- Type C vacuum-insulated independent liquefied gas fuel storage tanks without access openings need not be examined internally. Tanks, insulation and support arrangements are to be visually examined. Non-destructive testing may be required if conditions raise doubts as to their structural integrity. Where fitted, the vacuum monitoring system is to be examined and records are to be reviewed.
- All other types of liquefied gas fuel storage tanks are to be surveyed in accordance with the relevant cargo tank requirements in *Pt 1, Ch 3, 9.7 Special Survey I (ships five years old) − General requirements*.

23.4.12 Methyl alcohol (methanol) or ethyl alcohol (ethanol) fuel storage tanks are to be surveyed in accordance with the approved inspection/survey plan, including:

- Tanks are to be externally examined, including their supporting arrangements. Where deemed necessary, insulation is to be removed and non-destructive testing is to be carried out.
- Tanks are to be internally examined and the condition of any protective coating or corrosion prevention system is to be examined as follows:
    I. Special Survey I (Ships 5 years old) – None.
    II. Special Survey II (Ships 10 years old) - One tank.
    III. Special Survey III (Ships 15 years old) - Two tanks (if more than one fitted).

IV. Special Survey IV and subsequent (Ships 20 years old and over) – 50 per cent of tanks (minimum two if more than one fitted).

- Boundaries of tanks are to be tested to the highest point that liquid will rise to under service conditions. Testing may be undertaken using low-flashpoint liquid fuel. Tank testing may be specially considered based upon a satisfactory external examination of the tank boundaries, and a confirmation from the Master stating that the pressure testing has been carried out according to the requirements with satisfactory results. Surveyors may extend the testing as deemed necessary.

23.4.13 Compressed gas fuel storage tanks, including gas bottle arrangements, are to be internally and externally examined and pressure tested. After reassembly, the complete arrangement is to be tested for leaks.

23.4.14 Fuel storage tanks other than those listed in *Pt 1, Ch 3, 23.4 Complete Surveys 23.4.11*, *Pt 1, Ch 3, 23.4 Complete Surveys 23.4.12* and *Pt 1, Ch 3, 23.4 Complete Surveys 23.4.13* are to be surveyed in accordance with alternative/equivalent survey requirements in *Pt 1, Ch 3, 23.1 General 23.1.2*.

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